Safety is an indispensable factor when you are considering climate control for your rooms. Whether you are looking for air-conditioning in offices or banks, climate control in sensitive hospital wards, a process climate for IT and production areas or to meet cleanroom requirements. TOUFAN TAHVIEH Air conditioners provide the Perfect solution for all tasks. TOUFAN TAHVIEH is a 10-year old well established company in IRAN with production facility in KARAJ-IRAN, employing over 100 people. The staff of IRAN factory applies innovative approaches and tried-and tested expertise to provide customer needs solutions in line with the constantly increasing demands of the market place. We bring to fruition special projects and meet bespoke requirements, proof of our flexibility. Well thought out, all embracing solutions, from the original idea to advice, planning, development and production, right through to assembly and maintenance. Modern, state of-the-art production plants and consistently applied quality management under DIN EN ISO 9001:2000 guarantee a recognized quality standard for our products. "Just-in-time" delivery included.

Contents

Title Page

Overview

Process cooling can be an expensive. In general, we use the following guidelines when trying to reduce cooling costs.

1. Eliminate “once-through” cooling.
2. Use cooling towers rather than chillers when feasible.
3. Apply for sewer exemption on cooling tower make-up water.
4. Use gas-powered chillers rather than electric chillers when cost-effective.

Cooling Towers

Tower Performance

A cooling tower is a counter-flow or cross-flow heat exchanger that removes heat from water and transfers it to air. Cooling towers come in many configurations. Induced-draft cooling towers, such as the one shown below, generally use less fan power and have short circuit less air than forced-draft cooling towers.

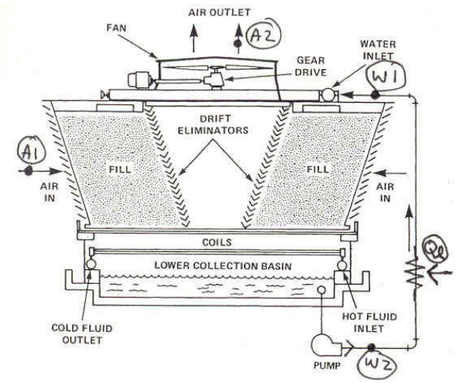


Figure 1. Induced-draft cross-flow cooling tower (Source: ASHRAE Handbook: HVAC Systems and Equipment, 2000)

The temperature difference of water through a tower, dT = Tw1-Tw2, is determined by the load, Ql, and the mass flow rate of water, mw. Neither the size of the tower nor the state of the outside air influences the temperature difference; however, larger towers or lower outdoor air wet-bulb temperatures will decrease the exit water temperature, Tw2.

Typically, most towers are sized for a 10 F temperature difference and about 2.4 gpm/ton of cooling. Fan motor hp is about 0.1 hp/ton and air flow rates are about 2,000 cfm/hp. The temperature of water from a cooling tower, Tw2, can be calculated based on tower performance data such as that shown below, water flow rate, cooling load, and the ambient wet-bulb temperature. This process can be automated in software to predict cooling tower performance with varying ambient conditions. For example, CoolSim (Kissock, 1997) calculates exit water temperatures, and the fraction of time that a cooling tower can deliver water at a target temperature, based on entering water temperature, Tw1, and TMY2 weather data. This information is useful in determining how often a cooling tower can replace a chiller in cooling applications.

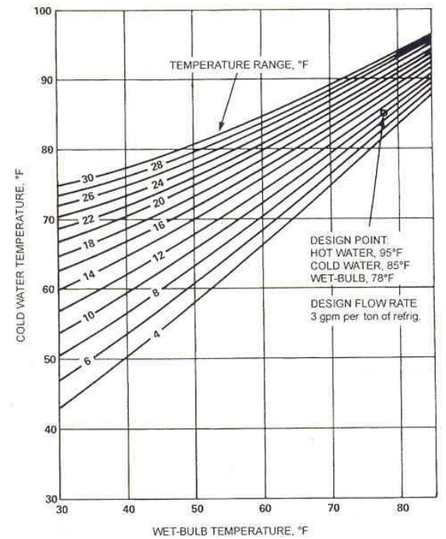


Fig 2 Cooling Tower Performance 100% Design Flow

Typical cooling tower performance curve (Source: ASHRAE Handbook: HVAC Systems and Equipment, 2000).

snsible and Latent Cooling

Depending on the entering air and water temperatures, the water may be cooled by sensible and latent cooling of the air, or simply by latent cooling of the air. In either case, latent, i.e. evaporative, cooling is dominant. For example, consider the case in which the air enters at a lower temperature than the water (Figure 3a). The air will leave completely saturated and the cooling is part sensible and part latent. The sensible portion occurs as the air temperature increases by absorbing heat from the water. The latent portion occurs as some of the water

evaporates, which draws energy out of the water.
If the air enters at the same wet bulb temperature as before, but at a higher dry-bulb temperature than the water, then the air will cool as it saturates (Figure 3b). Thus, the sensible cooling component is negative, and the all the cooling is due to evaporation. In general, cooling is dominated by latent cooling.

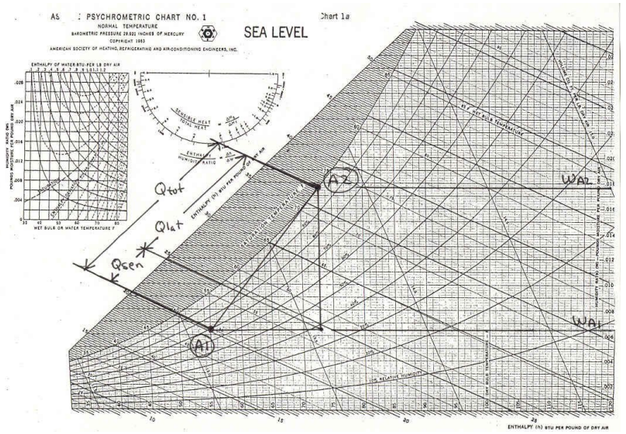


Fig 3 a

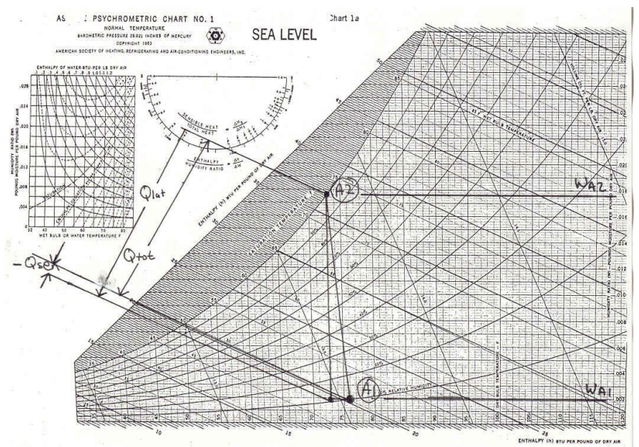
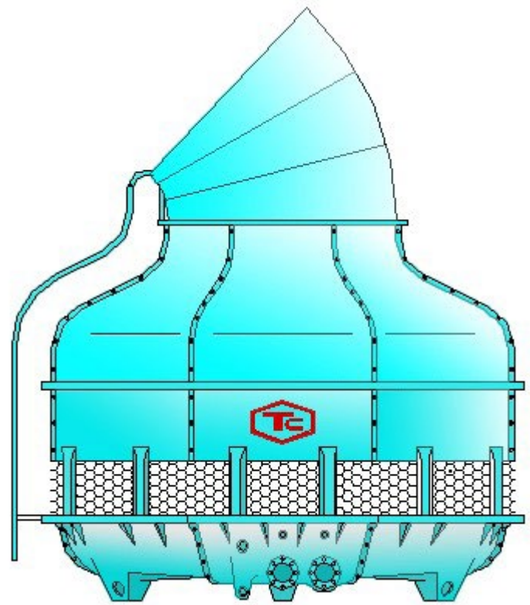


Fig 3 a

Psychometric process lines for air through a cooling tower,(if the entering air temperature is a) less than the entering water temperature, and b) greater than the entering water temperature.

The total cooling, ma (ha2 – ha1) is the same for both cases since enthalpy is a function of wet-bulb temperature alone. However, the dry-bulb temperature significantly influences the evaporation rate, mwe = ma (wa2-wa1). The rate of evaporation increases as the dry-bulb temperature increases for a given wet-bulb temperature.

Toufan Tahvieh Cooling Tower:



GENERAL

As a cooling towers manufacturer, you can choose from our six different types of cooling towers.

1. Induced draft counter flow cooling tower (TSC, film type filler)
2. Induced draft counter flow cooling tower (splash type filler)
3. Induced draft cross flow cooling tower (TCC, film type filler)
4. Induced draft cross flow cooling tower (splash type filler)
5. Induced draft counter flow closed type cooling tower
6. Induced draft cross flow closed type cooling tower

For splash type filler of the towers and the closed type towers please consult our sale for assistance.

The counter flow design (TSC) is compact; its bottle shape requires less space than that of the cross flow design (TCC) when installed. The full 360 degree air inlet allows flexible placement. Our towers are factory-fabricated, field-erected, FRP (fiber reinforced-polyester) constructed, PVC film--filled, induced-draft counter flow type, industrial duty, and non-corroding towers. Our patent drift eliminators achieve the low drift rates with a minimum obstruction to airflow. TSC Series is available in a wide range of capacities.

Our patented eliminator blades are standard features of Toufan Tahviye Cooling Tower products. This shall limit drift losses. As you can see from the pictures, our towers are free of water splash-out compare to others that show high drift losses.

Thai Cooling Tower products

Other maker products

Toufan Tahviye Cooling Tower offers

The following benefits:

- High efficiency.
- Guarantee capacity.
- Smooth operation and low noise.
- Low water loss.
- Trouble free of years operation.
- Durability.
- Efficient service.
- All parts are stored for prompt
- Service.

Feature of Design

Space saving and lightweight

Installation space and operation weight are greatly reduced compare to the conventional type cooling towers.

Energy saving

High efficiency gear motor with a high durability can help you save energy with low maintenance cost.

Low water loss

Our patented eliminator blades prevent sprinkling of water being blown off by the exhaust air. A wider cooled water basin rim is designed for holding back splashed drip.

Corrosion resistance

F.R.P. casing and all steel components are hot dipped galvanized steel give good corrosion resistance.

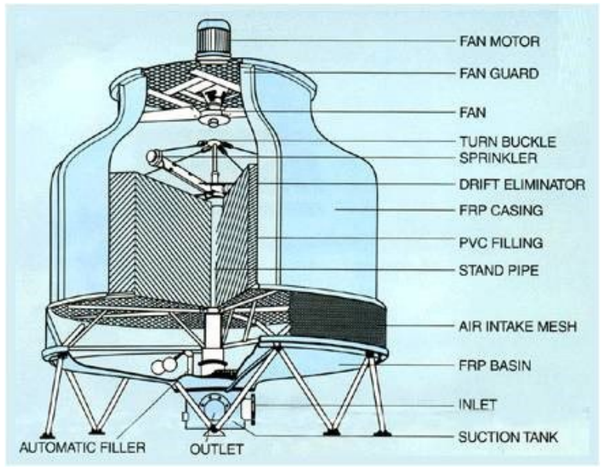
Leak proof and keep surrounding dry

Close and paralleled in and out water pipes facilitates installation, while at the same time saves money and parts. This designed together with our patented eliminator will make sure for water leak protection and maintain dry surrounding area.

Durability

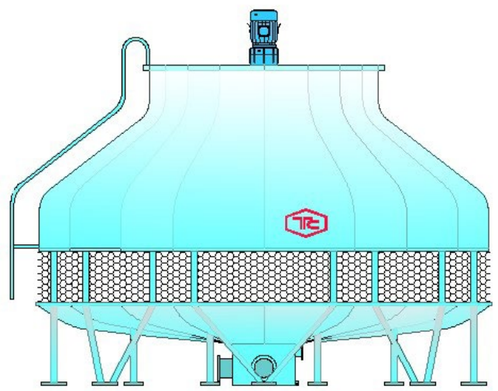
Toufan Tahviye Cooling Tower use gearbox speed reducer, all gears and roller bearing are lubricated in oil. Give a longer servicing time compared to belt drive.

STRUCTURAL DETAILS



OPERATION & MAINTENANCE

INSTRUCTION: TSC SERIES



YOUR COOLING TOWER

MANUFACTURER SPECIALIST

1. GENERAL

This instruction will assist in obtaining efficient, long life of TSC cooling equipment and parts.

It is necessary to know the maintenance and control of tower in order to have safety operation and to keep rated performance. To achieve this purpose, the construction and function as well as the adjustments and inspection of operation are described below.

2. DESCRIPTION

2.1 SHAPE OF THE TOWER

The tower proper shape is of cylindrical form, with an axial-flow fan mounted on the top to give vertical discharge. Since the tower is of bottle shape, its internal pressure loss is small as there is no ineffective space in the tower, the cooling efficiency and space economy are excellent. The structural details of the tower are shown in the picture below.

2.2 MOTOR

The tower of 3 RT - 150 RT use 6P - 8P motor for direct driving, 175 RT - 1200 RT use 4P motor with gear reducer.

2.3 FAN

Generally, cooling tower needs large air volume at low pressure, low noise and low mounting space requirements. Axial flow fan is most suited for this operation. 40 RT to 1200 RT has special aluminum alloy blades. The fan assembly is usually 4 blades with adjustable pitches. These fans have been special designed for cooling tower usage. They are at high efficiency and low noise level with stable air volume no matter how the air resistance of cooling tower changes.

2.4 SPRINKLER

The sprinkler consists of several distribution pipes, and is mounted on the top of standpipe, which is at the center of cooling tower.

The sprinkler assembly will circulating water. When hot water enters distribution pipes and is discharged from distribution holes, the reaction force is produced.

2.5 FILLER

The filler is made of PVC film of herringbone shape and is arranged as honeycomb type. This filler can distribute water evenly. The hot water can fully be contacted with cold air and to get high efficiency of heat dissipation. If entering water temperature exceeds 50°C, TSM type cooling tower (splash type filler) is recommended.

2.6 CASING

The casing is made by Fiberglass Reinforced Polyester, which is light, anti-rusty and without painting necessary. The casing can withstand earthquake and 60 m/s wind velocity.

The louver post also does as air inlet. For 3 RT - 350 RT, the tower is made by F.R.P. as one body.

2.7 WATER BASIN

The water basin is made of F.R.P. It is bowl--shaped, with one cylindrical auxiliary suction

tank at the bottom (400 RT to 1200 RT). This construction prevents the danger from drawing air into the pump when operating with very little water in the basin. Drain is provided to remove the accumulated dirt at the bottom of the tank. The bowl shaped of basin makes the cleaning of tower inside easily.

For 3 RT to 350 RT of tower, the junctions of main pipe and incidental small pipes are arranged at the same face. For 400 RT to 1200 RT, it is arranged at auxiliary suction tankto facilitate pipe connections.

2.8 BASIN SUPPORT AND MECHANICAL EQUIPMENT SUPPORT

For 400 RT - 1200 RT, basin support is made of steel with hot dipped galvanized treatment. 3 RT - 350 RT has no basin support and is made of maintenance-free F.R.P.

Motor framework, ladders are made of hot dipped galvanized treated steel.

3. PRE-STARTING PROCEDURES

3.1 CLEANING

Open the drain at the bottom. Wash out dirt, trash and scrubbing water basin with brush.

3.2 TRIAL WATER CIRCULATION

Fill the water basin until floating valve turns off. Rotate sprinkler by hand to be sure of free rotation. Turn on circulating pump and make up water in basin to normal level.

3.3 INSPECTION

All equipment should be done by following inspections.

3.3.1 before start-up (after the circulation test), cheek if dirt or foreign matter jam inside the tower or block distribution pipes.

3.3.2 Rotate the fan by hand to be sure of free rotation and ample tip clearance.

3.3.3 Measure the supplied voltage and check if power is suited for fan motor. Run the fan momentarily to check that the fan must rotate clockwise when viewed from top.

3.3.4 Then run the fan two or three hours to check if vibration or abnormal noise happened. If it happens, see trouble shooting for treatment.

3.3.5 Check the function of make-up water source. Move the float valve up and down to check water supply and control condition.

4. STARTING-UP PROCEDURES

4.1 SYSTEM OF WATER FILLING

Run the pump intermittently for five minutes to drive air out of the water pipes. Check water level in the basin before tower operated. Start the pump and adjust the regulating valve to get required water flow rate.

4.2 STARTS THE FAN

Check that there is no foreign matter to interfere the fan operation. After starting the fan, to be sure that phase current and voltage

measurement agree with the name plate data of motor.

5. OPERATION

5.1 TOWER PERFORMANCE

Maintain specified water flow to obtain rated cooling capacity keep the tower clean to prevent scale and algae forming. The cooling capacity of a tower depends on the wet-bulb temperature and the heat load on the tower. As the wet-bulb temperature drops, the cold water-temperature also drops. However, the cold water temperature drops not so much as wet bulb temperature does.

5.2 COLD WATER BASIN

If the water level in basin drops, air may be sucked into pump and cause cavitation. Water level must be kept a few centimeters (e.g. 5 cm) below overflow level.

5.3 REGULAR CHECK FOR VIBRATION, NOISE AND SPRINKLER SYSTEM

Regularly check the cooling water temperature, motor current and the oil level of gear reducer. The vibration or noise is usually produced from moving parts, i.e. the gear reducer and the fan. Be careful and do not overlook even small defect. Inspect sprinkler system and make sure water disperses evenly.

6. MAINTENANCE

Well maintenance equipment gives the best operating results and the least maintenance cost. See section 8 inspections and maintenance schedule for detail.

6.1 FAN

Regular check fan operation and clean the blades. Inspect and see if screw is loosen.

6.2 GEAR REDUCER (HELICAL GEAR TYPE)

6.2.1 Refill proper lubricating oil to the full mark. Change oil at least every 6 months or 3,000 hours of operation.

6.2.2 Check oil weekly for oil level. If needed, added oil to gear reducer.

6.2.3 Check oil monthly for condensation and sludge. If condensation or sludge is noted, change the oil immediately. Unusually high water temperature and often start stop working condition may cause condensation inside the housing which contaminates the oil and forms sludge. Check gear reducer exterior twice a year. Touch up with paint as required. The suggested lubricants are listed as below.

Company	Lubricant Designation
Caltex	Thuban 140
Castrol	Castrol ST 140
Esso	Esso Gear Oil ST 140
Mobil	Mobilube C 140
PTT	PTT Gear Oil EP
Shell	Dentax 140

Drain Used-oil:

Remove oil cap and open oil drain valve, and then collect used-oil in an appropriate container. The oil drainage should be done when the lubricating oil is at working temperature.

Oil filling:

Tighten drain valve; pour oil into box to oil level. Make sure that the oil level is at the full mark. Make sure there are no oil leaks and all joints are tighten.

6.3 SPRINKLER

The rotating condition of the sprinkler will be affected if any scale or sludge is found in sprinkler. Should sprinkler revolution is abnormal or stopped first check if water circulation is normal. If so dismantle the rotary head for cleaning.

Model TSC	RPM	Model TSC	RPM
3-10 RT	12-20	200-250 RT	6-7
15-25 RT	10-12	300-350 RT	5-6
30-50 RT	9-10	400-500 RT	4-5
60-80 RT	8-9	600-700 RT	3-4
100-175 RT	7-8	800-1200 RT	2.5-3.5

6.4 DISTRIBUTION PIPES

Clean distribution pipes to avoid blockage. The cleaning of pipes can be done as following steps. Loosen sprinkler lock nuts, then unscrew and remove the pipes. For 40 RT and larger models, there are caps at the end of pipes. It is easily removed and cleaned. After cleaning and reassembling, the direction and the angle of distribution hole must be carefully adjusted (See the Marks).

6.5 CASING

Casing is made of F.R.P. It does not need any further painting. Just keep clean is enough.

6.6 FILLING

PVC filling do not deteriorate thus no special attention is needed. The water quality must be controlled to avoid the growth of scale, Slime, algae or green moss, which will influence cooling efficiency.

6.7 PAINTING

All steel parts subject to corrosion should be cleaned and painted periodically. Epoxy--base paints are recommended. Maintenance depends on surroundings and operation cycle.

6.8 WATER MAKE-UP

To maintain enough water levels in cold water basin, one floating valve is installed. As water level is dropped, water will be made up automatically. The water that make-up depends upon evaporation loss, drift loss and blow down.

6.8.1 Evaporation loss Evaporation loss (E) can be calculated as follows;

E (%) = ΔT /7

ΔT Cooling range (°C)

6.8.2 Drift loss (D) The TSC Cooling Tower is specially designed for the smallest drift loss. Hence the drift loss is lower than 0.2% of circulation water. 6.8.3 Blow Down (B) Blow down, or bleed-off, is the continuous removal of small portion of water from circulating system. Blow down is to prevent dissolved solids from concentrating and forming scale. The blow down water range at 5°C is about 0.3% at 10°C is about 0.7%

7. Trouble Shooting

TABLE 3. TSC Cooling Tower Trouble Shooting Chart

Trouble	Cause	Treatment
Cooling water too warm	1. Too much water	1. Reduce water flow according to designed condition.
	2. Irregular air flow	2. Improved ventilating condition.
	3. Exhausted air is sucked into tower again.	3. Same as above.
	4. Irregular operation of sprinkler and pipes. (uneven dissipation)	4. Removed dirt and scale.
	5. Poor air supply.	5. Check and make sure current and voltage are as rated horsepower. Adjust blade again.
	6. Blockage of filling.	6. Clean block area.
Unusual motor noise	1. Motor running single phased.	1. Stop motor and start again. Motor will not start it single phased. Check wiring, control and motor.
	2. Bad bearing.	2. Check and replace bad bearing if necessary.
	3. Electrical unbalance.	3. Check voltage and current of all three lines. Correct if required.
Gear reducer noise.	1. Dirt in lubricant.	1. Drain and replace oil.
	2. Bearing damaged.	2. For new bearing, see if noise disappears after one week of operation. If it still has noise, replace it.
Unusual fan vibration and noise.	1. Blade tips touch casing or other thing.	1. Adjust blade position and keep clearance.
	2. Unusual installation of fan blades.	2.Adjust fan blade angle.
	3. Bolts loosen.	3. Inspect and tighten all bolts.
	4. Fan unbalance.	4. Be sure blades are properly pitched the same angle. Rebalanced if required.
Cooling water volume drops	1. Blockage of the distribution holes.	1. See "6. Maintenance"
	2. Blockage of strainer.	2. Clean strainer.
	3. Drop in the water level of water basin.	3. Inspect floating valve function, then adjust.
	4. Improper selection of circulating pump.	4. Renew pump to planned water volume.
Current overload	1. Drop in voltage.	1. Check supply voltage against nameplate. Consult power company if necessary.
	2. Uneven angle of fan blades.	2. Adjust fan blade angles.
	3. Excess of airflow.	3. Same as above.

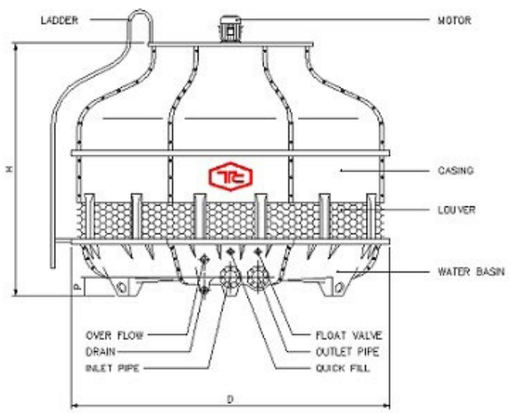
8. Inspection and Maintenance Schedule General recommendations: more frequent inspection and maintenance may be desirable

	Fan	Motor	Gear Reducer	Eliminator	Filler	Cold Water basin	Hot Water Distribution System	Casing	Float Valve	Strainer	Motor Base	Louver	Structural Bolts	Drain	Turnbuckle & Tension
1. Check for unusual noise	D	D	D												
2. Check for unusual Vibration	D														
3. Inspect for clogging							D			D					
4. Check for leakage						D			D						
5. Inspect for draining														D	
6. Check operating oil level															
7. Check oil for water&sludge															
8. Tighten loose bolts	S	S	S	S		Y		Y				M	Y		
9. Clean	S	S	S	-	S	S	M	Y		M		S			
10. Repaint	R	R	R	-	-	-	-	-	-	-	R		R		
11. Change oil			Y												
12. Check for operation air	S	S													
13. Tension															M
14. Electrical connection		S													
15. Measure rated amps		D													
16. Measure rated volts		D													
17. Check rotating condition							D								

MATERIAL SPECIFICATIONS

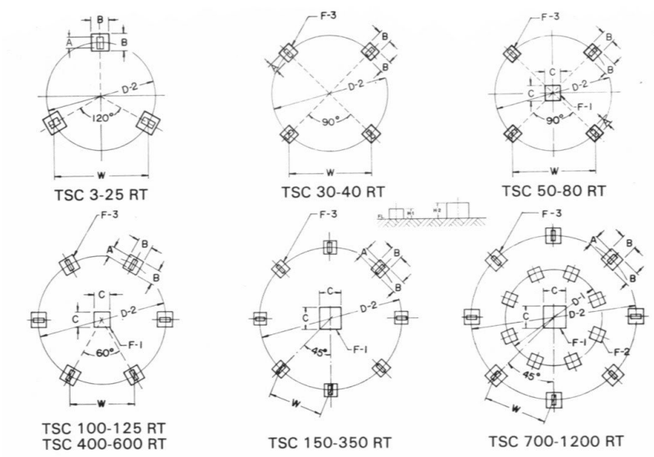
MODEL TSC-MRT	3	5	8	10	15	20	25	30	40	50	60	70	80	100	125	150	175	200	225	250	300	350	400	500	600	700	800	1000	1200
MOTOR	WATER PROOF TOTALLY ENCLOSED																TOTALLY ENCLOSED FAN COOLED												
FAN DRIVE	DIRECT DRIVE																GEAR DRIVE OR BELT DRIVE												
FAN DRIVE	SS BLADE								SPECIAL ALUMINIUM ALLOY ADJUSTABLE BLADE																				
CASING	GLASS FIBRE REINFORCED PLASTIC																												
SPRINKLER	ABS								SPECIAL ALUMINIUM ALLOY WITH STAINLESS STEEL SHAFT																				
ELIMINATOR	GLASS FIBRE REINFORCED PLASTIC																												
FILLER	PVC																												
AIR INLET MASH	PVC																												
LADDER	HDG																												
MOTOR SUPPORT	HDG																												
SUPPORT POST	GLASS FIBRE REINFORCED PLASTIC																							HDG					
BASIN SUPPORT	GLASS FIBRE REINFORCED PLASTIC																							HDG					
STRAINER	STAINLESS STEEL MESH																												
WATER BASIN	GLASS FIBRE REINFORCED PLASTIC																												

MATERIAL SPECIFICATIONS



Model TSC	Cooling Capacity (RT)	Air Volume (CuM/min)	Water Flow (l/min)	Dimension (mm)		PIPE CONNECTION (mm)							FAN	
				H	D	IN	OUT	O	Dr	Ba	Q	P	DIA (mm)	MOTOR (HP)
3RT	3	27	39	1200	680	25	25	25	25	15	-	120	360	1/10
5RT	5	41	65	1250	820	40	40	25	25	15	-	150	460	1/8
8RT	8	60	98	1250	820	40	40	25	25	15	-	150	460	1/6
10RT	10	74	130	1320	960	40	40	25	25	15	15	150	460	1/4
15RT	15	110	195	1450	1100	50	50	25	25	15	15	175	670	1/2
20RT	20	160	260	1550	1200	50	50	25	25	15	15	175	670	1/2
25RT	25	200	325	1590	1400	65	65	25	25	15	15	190	860	1/2
30RT	30	225	390	1730	1620	65	65	25	25	15	15	200	860	3/4
40RT	40	280	520	1780	1720	80	80	32	32	20	20	220	960	1
50RT	50	330	650	1860	1960	80	80	32	32	20	20	185	960	1
60RT	60	420	780	1860	1960	80	80	32	32	20	20	185	960	1 1/2
70RT	70	510	910	1900	2160	100	100	32	32	20	25	225	1160	1 1/2
80RT	80	550	1040	1900	2160	100	100	32	32	20	25	225	1160	1 1/2
100RT	100	700	1300	2390	2700	125	125	50	32	25	25	230	1500	2
125RT	125	830	1675	2550	2960	125	125	50	32	32	25	310	1500	2
150RT	150	950	1950	2653	3460	150	150	50	50	32	32	275	1700	3
175RT	175	1150	2275	2653	3460	150	150	50	50	32	32	275	1700	5
200RT	200	1250	2600	2785	3860	150	150	50	50	32	32	275	2100	7 1/2
225RT	225	1750	2925	2785	3860	200	200	100	50	32	32	275	2100	7 1/2
250RT	250	1850	3250	2885	3860	200	200	100	50	32	32	275	2100	7 1/2
300RT	300	2200	3900	3710	4700	200	200	100	50	32	32	300	2400	10
350RT	350	2300	4550	3750	4700	200	200	100	50	32	50	300	2400	10
400RT	400	2600	5200	4290	5400	250	250	100	50	50	50	260	3100	15
500RT	500	2750	6500	4290	5400	250	250	100	50	50	50	260	3100	15
600RT	600	3750	7800	4470	5750	250	250	150	50	50	50	260	3100	20
700RT	700	4050	9100	4850	6800	250	250	150	50	50	50	260	3400	20
800RT	800	5000	10400	5080	7340	300	300	150	80	80	80	260	3600	25
1000RT	1000	5500	13000	5080	7340	300	300	150	80	80	80	260	3600	30
1200RT	1200	5600	15600	5200	8500	300	300	150	80	80	80	260	4200	40

CONCERETE FOUNDATION DETAILS

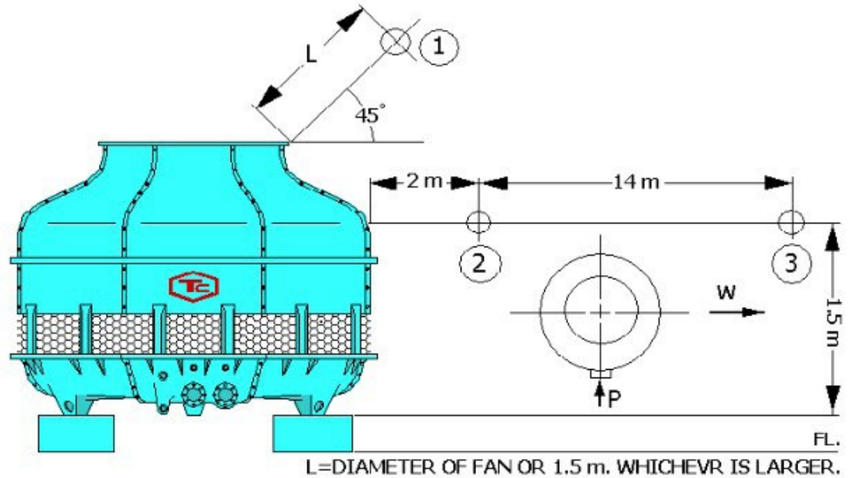


Model TSC	WEIGHT (kg)		Dimension (mm)						F-1 (kg)	F-2 (kg)	F-3 (kg)	H-1 (mm)	H-2 (mm)	ANCHOR BOLT			PUMP HEAD (m)
	DRY	OPR.	D-1	D-2	W	A	B	C						SIZE	L	QTY.	
3RT	26	65	-	346	300	100	180	-	-	-	22	150	-	12	120	3	1.2
5RT	42	110	-	485	420	100	180	-	-	-	34	150	-	12	120	3	1.2
8RT	45	118	-	485	420	100	180	-	-	-	46	150	-	12	120	3	1.2
10RT	50	178	-	612	530	100	180	-	-	-	59	150	-	12	120	3	1.3
15RT	65	235	-	692	600	100	200	-	-	-	87	150	-	12	120	3	1.4
20RT	90	330	-	808	700	100	200	-	-	-	110	150	-	12	120	3	1.5
25RT	95	400	-	970	840	100	200	-	-	-	140	150	-	16	120	3	1.6
30RT	110	500	-	1175	830	100	250	-	-	-	125	200	-	16	120	4	1.8
40RT	165	580	-	1330	940	100	250	-	-	-	163	200	-	16	120	4	1.8
50RT	205	630	-	1420	1005	100	250	250	255	-	148	200	200	16	120	4	1.9
60RT	225	650	-	1420	1005	100	250	250	274	-	164	200	200	16	120	4	1.9
70RT	285	680	-	1700	1202	100	250	250	346	-	207	200	200	16	180	4	2.0
80RT	305	700	-	1700	1202	100	250	250	353	-	212	200	200	16	180	4	2.0
100RT	425	1110	-	2100	1050	100	300	600	510	-	200	300	300	16	200	5	3.0
125RT	480	1300	-	1420	1210	100	300	600	585	-	228	300	300	16	200	5	3.0
150RT	650	1800	-	2700	1033	100	300	600	750	-	218	300	300	16	200	7	3.2
175RT	680	2300	-	2700	1033	100	300	600	870	-	254	300	300	16	200	7	3.2
200RT	780	2900	-	3050	1167	100	300	600	1000	-	291	300	300	16	200	7	3.5
225RT	800	3200	-	3050	1167	100	300	600	1020	-	298	300	300	16	200	7	3.5
250RT	850	3500	-	3050	1167	100	300	600	1050	-	306	300	300	16	200	7	4.0
300RT	1500	4400	-	3950	1511	100	300	700	1320	-	385	300	300	16	200	8	4.0
350RT	1600	4500	-	3950	1511	100	300	1000	1380	-	402	300	300	16	200	8	4.0
400RT	2200	6700	-	5100	2550	350	500	1000	2220	-	863	300	300	20	200	12	5.0
500RT	2450	7000	-	5100	2550	350	500	1000	2550	-	990	300	300	20	200	12	5.0
600RT	3150	9300	-	5400	2700	350	500	1000	2790	-	1085	300	300	20	200	12	5.5
700RT	3800	10650	3850	6500	2487	350	500	1000	3230	110	944	300	300	20	200	16	5.5
800RT	4500	12000	4460	7100	2716	350	500	1000	3300	125	962	300	300	20	200	16	6.0
1000RT	5050	12300	4460	7100	2716	350	500	1000	3390	125	988	300	300	20	200	16	6.0
1200RT	5600	13200	5000	8200	3138	350	500	1000	4000	150	1000	300	300	20	200	16	6.5

WATER FLOW SELECTION TABLE

W.B	28 C																		29 C			31 C		
Temp. Dif	5 C			6 C		7 C			8 C			9 C		10 C					5 C			5 C		
Inlet	38	37	36	38	37	40	39	38	41	40	39	41	40	45	43	42	41	39	38	37	41	40	39
&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&
Outlet	33	32	31	32	31	33	32	31	33	32	31	32	31	35	33	32	31	34	33	32	36	35	34
3RT	44	36	28	31	25	33	27	22	29	25	20	23	19	34	25	21	-	47	37	29	53	39	29
5RT	67	55	43	48	38	51	42	34	44	38	30	35	29	52	38	32	-	70	57	45	74	61	46
8RT	107	90	70	77	62	82	69	56	75	64	51	59	49	85	65	54	44	112	90	74	120	90	80
10RT	137	112	87	96	76	102	86	68	93	78	62	73	60	105	77	65	57	144	117	91	158	121	96
15RT	204	170	130	144	116	155	130	104	140	118	95	109	90	160	122	100	82	213	170	137	231	170	149
20RT	270	225	175	193	153	205	172	137	188	155	123	142	115	210	158	130	120	285	230	181	300	230	183
25RT	338	283	223	244	195	260	219	175	239	200	159	184	150	270	204	170	145	355	290	231	355	280	220
30RT	405	340	270	295	236	315	265	213	290	245	195	225	185	330	250	210	170	425	350	280	455	350	285
40RT	540	450	365	400	326	425	360	295	385	335	275	305	255	440	340	290	240	570	465	375	610	480	380
50RT	670	570	460	505	420	540	460	380	505	430	355	395	333	570	440	380	320	700	590	480	740	615	520
60RT	820	700	560	610	510	660	560	465	600	520	430	490	405	690	535	460	380	860	720	590	930	720	650
70RT	930	810	660	720	605	775	665	555	705	620	520	580	490	820	645	550	465	950	840	680	970	835	690
80RT	1040	920	760	830	700	890	770	645	810	720	605	680	570	950	750	640	550	1040	960	770	1040	940	770
100RT	1370	1150	935	1020	850	1100	930	770	1020	870	720	810	680	1150	890	760	640	1430	1200	975	1550	1300	1040
125RT	1670	1420	1150	1250	1040	1360	1140	950	1240	1070	870	1000	830	1380	1110	940	790	1740	1480	1200	1830	1570	1300
150RT	2000	1700	1380	1520	1260	1640	1390	1160	1500	1290	1070	1210	1010	1720	1340	1150	960	2100	1760	1450	2200	1850	1570
175RT	2360	2020	1620	1790	1480	1930	1640	1360	1760	1520	1260	1430	1190	2020	1580	1350	1130	2480	2090	1720	2650	2140	1860
200RT	2650	2270	1830	2020	1670	2180	1850	1540	2000	1730	1440	1620	1340	2300	1790	1530	1280	2800	2350	1930	2900	2450	2090
225RT	3000	2500	2030	2200	1800	2350	2000	1670	2180	1860	1540	1745	1450	2480	1900	1630	1370	3150	2600	2130	3300	2800	2330
250RT	3400	2900	2320	2540	2100	2750	2330	1930	2500	2150	1790	2000	1690	2870	2200	1900	1600	3600	2990	2450	3920	3040	2610
300RT	4000	3350	2730	2980	2450	3200	2700	2260	2950	2550	2080	2350	1950	3350	2600	2200	1850	4200	3500	2880	4400	3800	3020
350RT	4700	4000	3250	3550	2950	3850	3250	2720	3550	3000	2540	2820	2360	4050	3150	2700	2250	4900	4100	3400	5200	4100	3610
400RT	5650	4800	3900	4250	3550	4600	3900	3250	4200	3650	3060	3420	2850	4900	3800	3250	2750	5900	5000	4100	6400	5400	4500
500RT	6750	5800	4800	5250	4400	5650	4850	4050	5250	4550	3850	4270	3640	6000	4750	4150	3450	7050	6000	5000	7550	6250	5250
600RT	8100	6900	5650	6150	5100	6600	5700	4700	6150	5250	4400	4950	4170	7000	5450	4700	3950	8550	7200	5850	9150	7800	5950
700RT	9400	8100	6600	7250	6100	7800	6700	5650	7250	6300	5250	5940	5000	8400	6550	5700	4800	9850	8400	6950	10450	8700	7550
800RT	10800	9200	7500	8200	6750	8850	7500	6300	8150	7000	5850	6550	5500	9400	7300	6150	5250	11300	9500	7800	12100	9800	8250
1000RT	13500	11600	9600	10600	8800	11350	9750	8250	10650	9200	7800	8700	7400	12100	9600	8400	7100	14100	12000	10000	15100	12500	10800
1200RT	16200	13800	11300	12300	10200	13200	11400	9400	12300	10500	8800	9900	8340	14000	10900	9400	7900	17100	14400	12300	17100	15600	11900

NOISE LEVEL



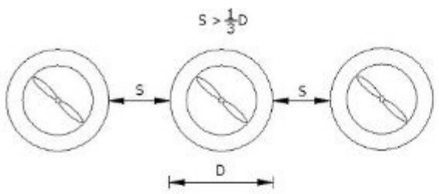
L=DIAMETER OF FAN OR 1.5 m. WHICHEVR IS LARGER.

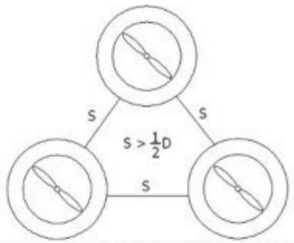
MODEL TSC xRT	3	5	8	10	15	20	25	30	40	50	60	70	80	100	125	150	175	200	225	250	300	350	400	500	600	700	800	1000	1200
POSITION 1	59	59	60	61	66	66	73	73	74	74	74	78	79	76	81	77	80	79	76	76	77	77	79	79	77	77	78	80	80
POSITION 2	56	56	55	56	63	63	67	67	68	68	68	72	73	68	71	71	75	73	71	71	72	72	74	74	72	72	74	75	75
POSITION 3	46	46	44	45	50	50	58	58	59	59	59	63	64	57	61	62	65	63	62	62	63	63	65	65	63	63	65	66	66

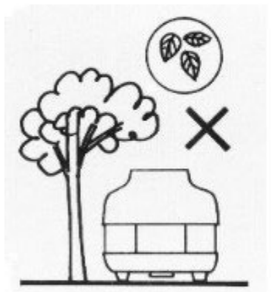
INSTALLATION LOCATION

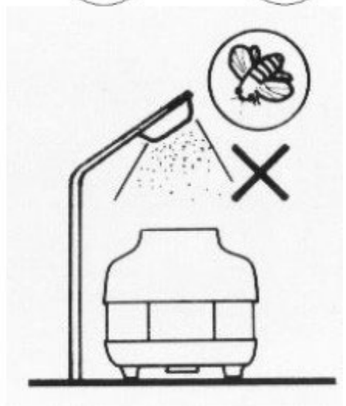
GUIDE

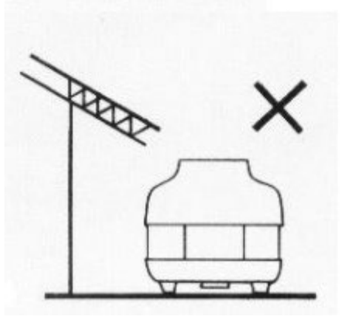
- Best site for cooling tower is open air.
- In case of multicellular installation in line, perpendicular installation to air flow direction is recommended.
- Smoke and dusty location should be avoided.
- Keep away from high voltage line or transformer.











TOUFAN TAHVIEH ALBORZ